A Regularized Algorithm for Local Emission Reconstruction in Spectroscopic Tomography

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ABSTRACT

A regularized algorithm using the inverse Radon transform for the solution of problems in plasma tomography is proposed. To improve the reconstruction quality, the application of additional *a priori* knowledge obtained from spectroscopic measurements is suggested. That can be information on the probable smooth dependence of the reconstructed function on the wavelength. Efficient algorithms are presented. Their efficiency is demonstrated by mathematical experiments.

INTRODUCTION

The development of diagnostic methods of plasma study has led to the application of techniques and algorithms of computerized tomography (CT) [1].

The major difference between plasma and medical tomography is the difficulty in obtaining an overall view of the object in the former case. Few viewing angles are available to determine a tomographic image reconstruction when experimental data are insufficient. In such conditions the solution and the application of regularized algorithms require the application of additional *a priori* knowledge.

The application of additional knowledge obtained from spectroscopic measurements makes it possible to improve the reconstruction quality. Since it is reasonable to assume a smooth dependence of the reconstructed function on the wavelength, its inclusion in the complex processing of the data holds

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